

## Science

### NASA Langley Research Center Flight Projects Directorate Office **Stratospheric Aerosol and Gas Experiment III - International Space Station (SAGE III/ISS)**

#### What is SAGE III/ISS?

Just as humans need a smudge of zinc oxide on the nose at the beach, the Earth needs sunblock too. Earth's sunscreen is called ozone, and SAGE III will be checking up on whether or not Earth has been reapplying.

More than 25 years ago, scientists realized there was a problem with Earth's thin, protective coat of ozone...it was thinning. The SAGE family of instruments was pivotal in making accurate measurements of the amount of ozone loss in Earth's atmosphere.

Today, the SAGE technique is still the best for the job, and NASA scientists are preparing to send the third generation of the instrument into space. However, not just any spacecraft will do for SAGE III.

Scientists have been keeping it safe, waiting for the day that it could go where no continuous Earth-observing instrument has gone before – the International Space Station (ISS).

Instead of flying on an un-manned satellite, SAGE III will be mounted to the ISS where it will operate



Teams from NASA LaRC, NASA KSC, and ESA contributed to preparing the SAGE III/ISS instrument payload and Nadir Viewing Platform for flight.

alongside experiments from all over the world in the space-based laboratory. The orbital path of ISS will help maximize the scientific value of SAGE III observations while proving that atmospheric science instruments do have a place on the space station.

SAGE III is scheduled to board one of NASA's first commercial SpaceX flights for a ride to its new home. Once on ISS, SAGE III will do what it does best – Earth observations to extend a long record of atmospheric measurements for the continued health of Earth and its inhabitants.

### Why SAGE III/ISS?

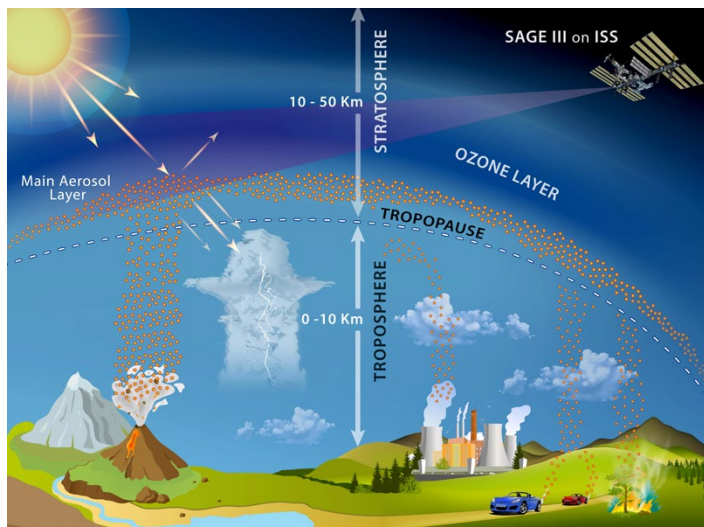
When Earth's ozone-based sunscreen starts to break down, all of Earth's inhabitants are affected. Humans, plants and other animals are exposed to more harmful rays from the sun, which can cause long-term problems like cataracts and cancer in humans and reduced crop yield in plants.

SAGE III will look at ozone and several other gases in the atmosphere to help us better understand the way they interact and change. Through this dataset, NASA extends the scientific foundation for further sound decisions on environmental policy, both nationally and internationally.

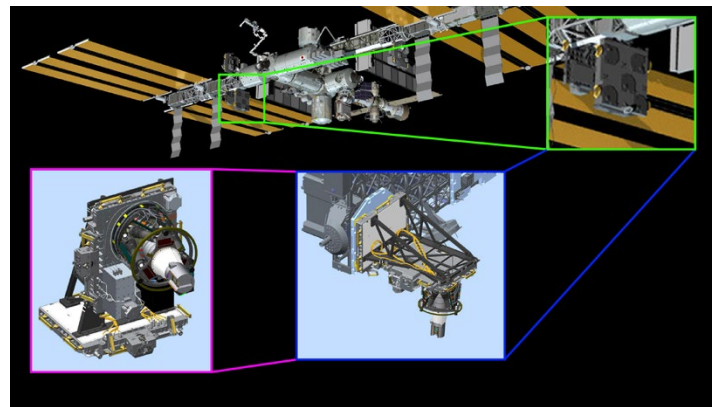
### Did you know?

SAGE is one of NASA's longest-running Earth-observing programs, starting with SAGE I in 1979. SAGE II operated and produced data for over 21 years in orbit.

The data SAGE II collected was integral to confirming human-driven changes to ozone, and thus contributed to the



SAGE III is part of NASA's mission to provide long-term measurements of ozone, Earth's sunscreen, and aerosols, tiny particles in the atmosphere.



SAGE III will make its measurements from the International Space Station. It is installed robotically and launched on a SpaceX vehicle.

1987 Montreal Protocol that banned certain harmful chemicals. SAGE II also saw that ozone stopped decreasing in response to this action.

SAGE III consists of three instruments. The first SAGE III was launched in 2001 on a Russian satellite, Meteor-3M. The second SAGE III was safely stored away until 2009 when it was removed in preparation for flight on the space station. The third is still being stored for a future flight of opportunity.

SAGE III on ISS is led by the Science Directorate, a unique NASA Langley organization devoted to finding out how the Earth and its atmosphere are interacting and changing—and what that means for the health of our planet and our quality of life. We search for and create better ways of gathering, measuring and analyzing atmospheric data so that we can better understand and track the effects of human activity on the atmosphere. We believe a healthy planet is possible if we act responsibly based on factual information and solid science. Learn more at [sage.nasa.gov](https://sage.nasa.gov).



This photo of the sunrise taken from the International Space Station is similar to the view SAGE has on orbit while measuring ozone and aerosols.

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